

# Electron States in Photolysis Generated Nitrenes

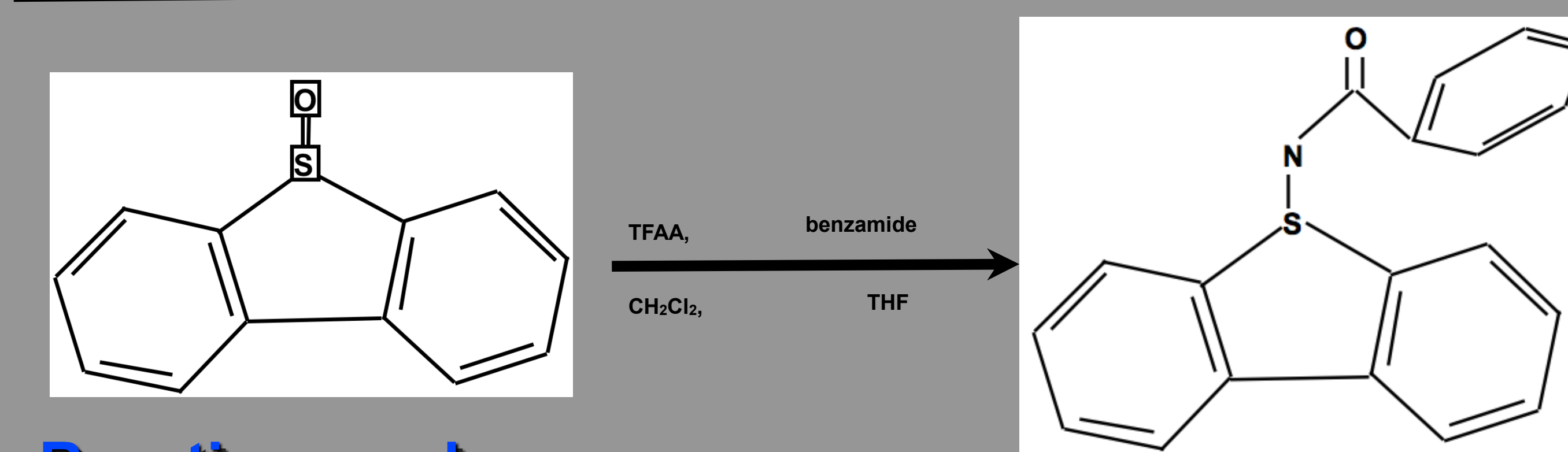
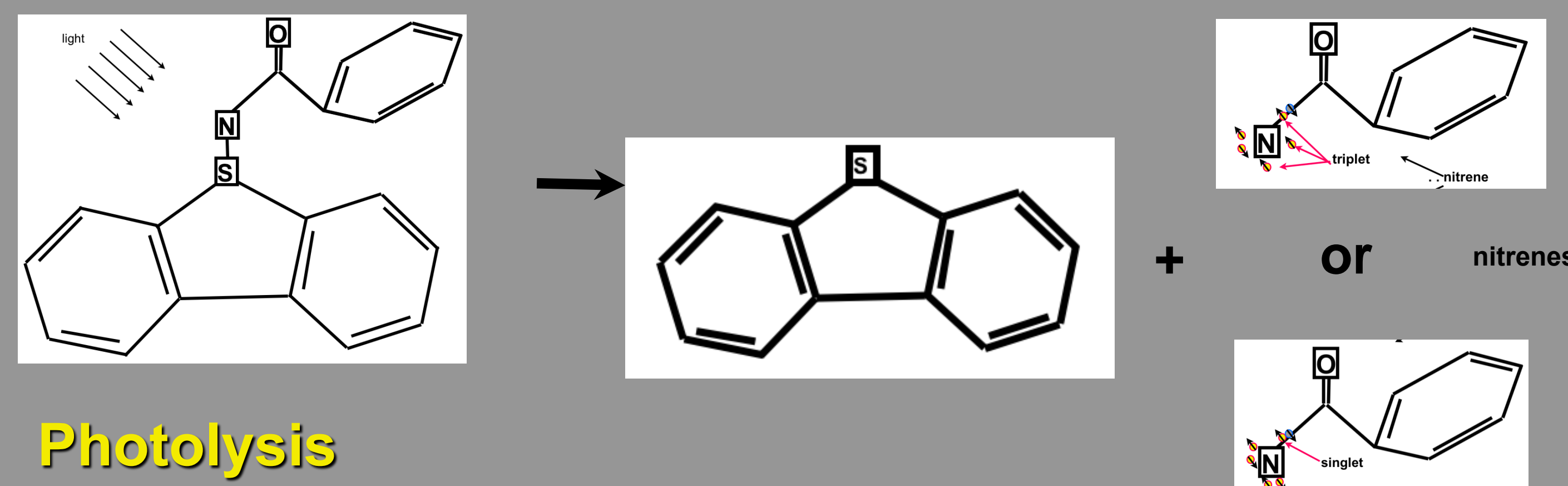
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## ABSTRACT

Photolysis is the process of light decomposing molecules. In selected molecules, one product generated is a nitrene. The nitrene molecule has an exposed nitrogen on the end of the molecule. There are two possibilities for the state of the electrons on the nitrogen, singlet state and triplet state. Most nitrenes with a carbonyl group adjacent exist in the singlet state, but this research is to investigate a potential exception.

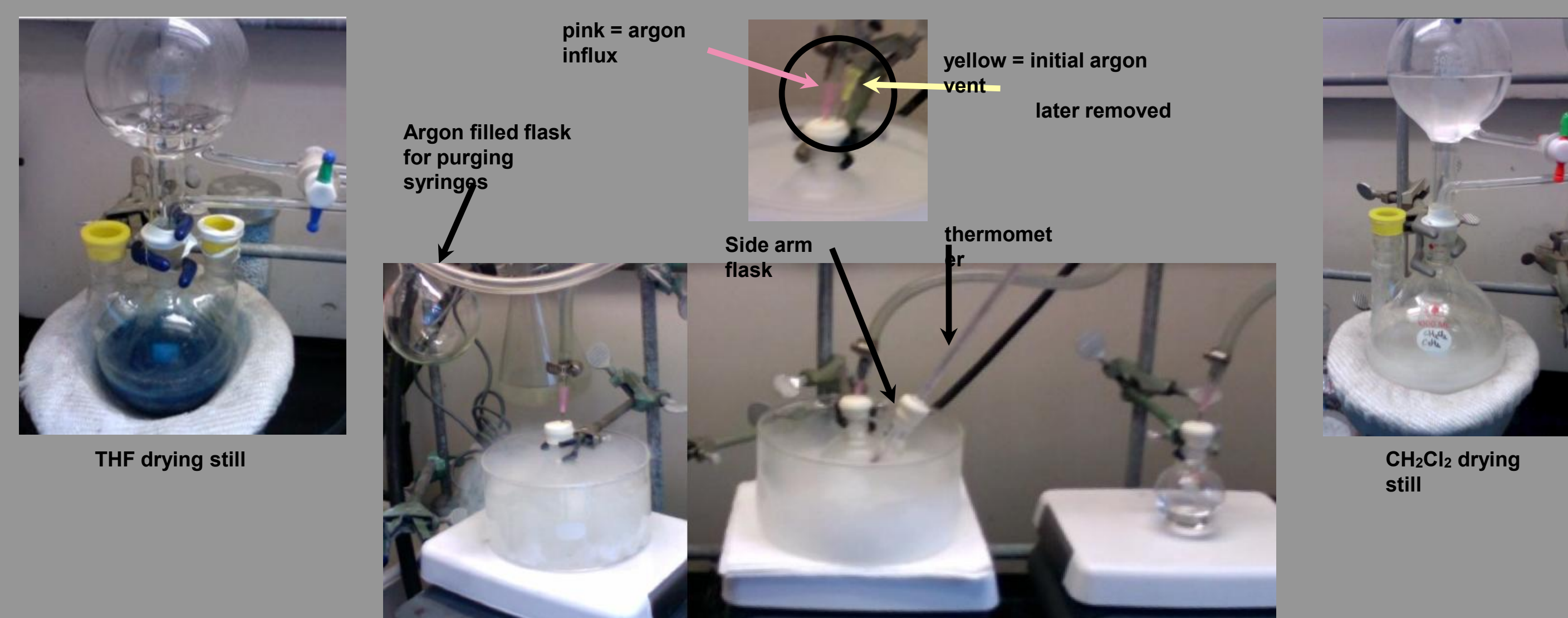


## DISCUSSION

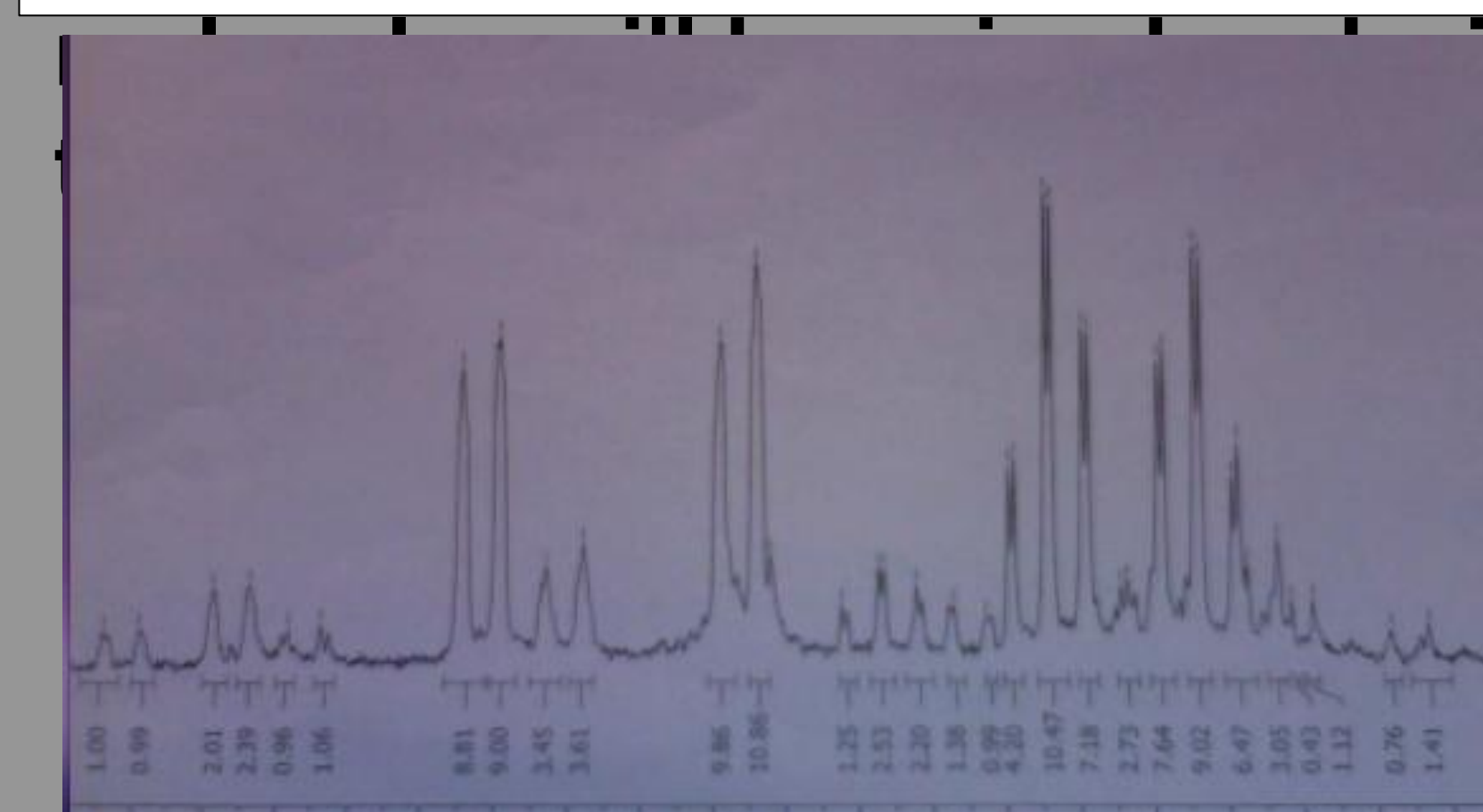
With the forthcoming energy predicament, solar energy in its many forms becomes increasingly important as the alternate primary energy source to replace fossil fuels. It becomes imperative to understand the exact effects that light has when it impacts molecules. Photolysis is the process of light decomposing molecules. One molecule has been detected that goes against expected trends. By investigating this molecule, further understanding of the effects of light on

## BACKGROUND

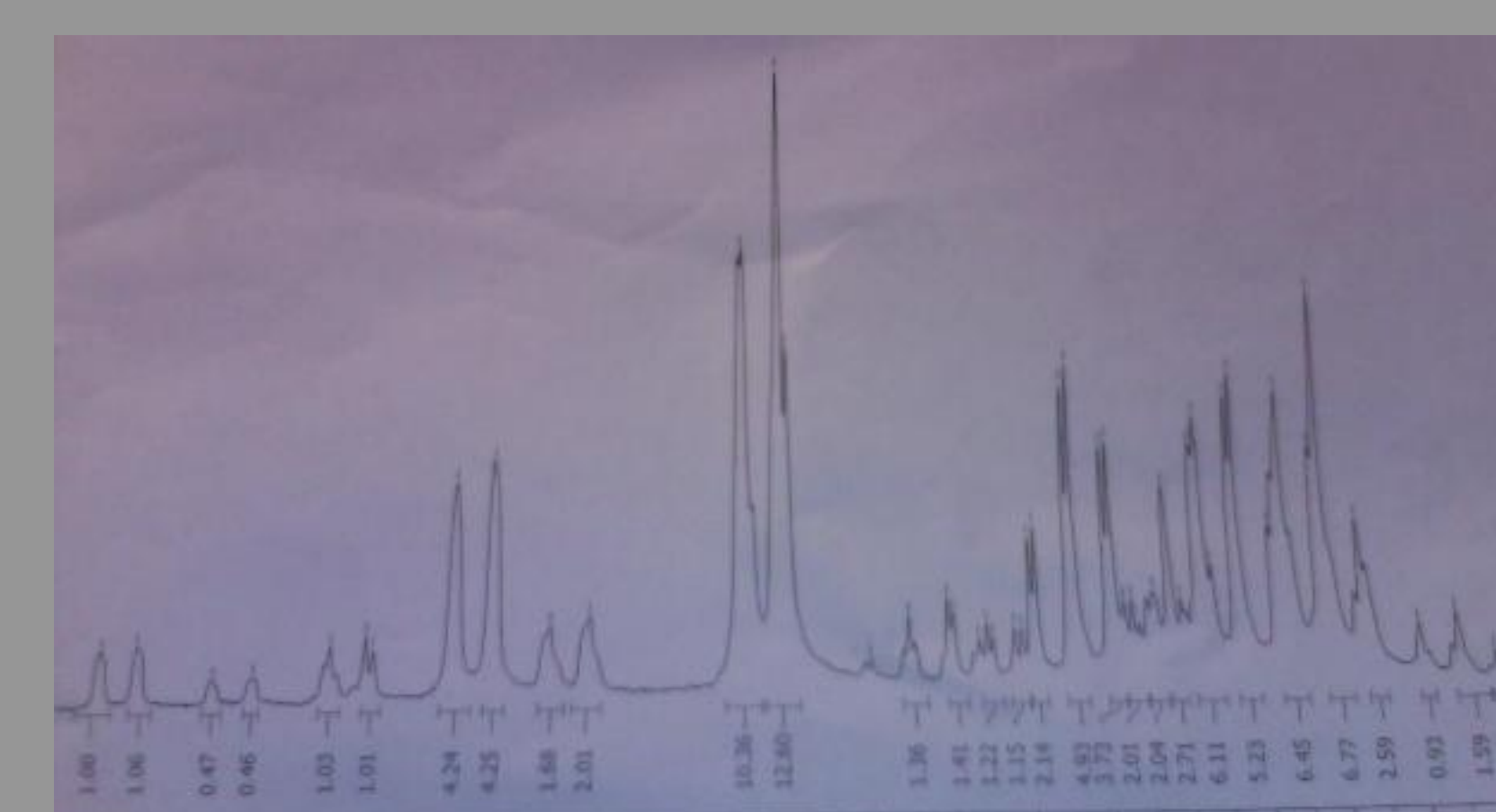
Photolysis of *N* - trifluoroacetyl-dibenzothiophene sulfilimine is proposed to produce a molecule that does not follow the predicted electron state multiplicity. The focus of this project was to establish successful synthesis procedures so that quantities of the molecule could be synthesized and sent away for electron state studies.



Successful Apparatus set up



Reference NMR for crude *N* - phenylacetyl dibenzo thiophene sulfilimine



NMR for crude *N* - phenylacetyl dibenzo thiophene sulfilimine from modified procedure

## RESEARCH

The synthesis procedure for the formation of *N* - phenylacetyldibenzothiophene sulfilimine will be adjusted until a consistent product is formed. The adjustments learned here will be applied to the synthesis procedures for the *N* - trifluoroacetyldibenzothiophene sulfilimine procedures. This will allow later workers to produce research quantities of the needed molecule.

## METHOD

The original procedures for this reaction were found in references 1 and 2.

## RESULTS

- 1) All reactions need to be carried out under argon.
- 2) All reaction vessels need to have an argon purge of at least 1/2 hour before any further action.
- 3) Temperature needs to be monitored with a thermometry device and never allowed to exceed room temperature.
- 4) All solvents need to be dried.

## REFERENCES

- 1) Desikan, V.; Liu, Y.; Toscano, J.; Jenks, W.; *J. Org. Chem.* **2007**, 72, 6848 - 6859
- 2) Desikan, V.; Liu, Y.; Toscano, J.; Jenks, W.; *J. Org. Chem.* **2008**, 73, 4398 - 4414

## ACKNOWLEDGEMENT

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